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Author: Howley, Craig - Strange, Marty - Bickel, Robert

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Many panels and experts have endorsed small schools as educationally effective, often adding the parenthetical remark that smaller size is especially beneficial for impoverished students. A recent series of studies, the "Matthew Project," substantially strengthens the research base on school size and school performance in impoverished communities, adding evidence to bolster these claims. This Digest reviews recent thinking about small school size, describes the aim of the Matthew Project studies, and summarizes findings. Discussion concludes with a brief section on implications.

REPORTED BENEFITS OF SMALLER SCHOOL SIZE

Since the mid-1990s, there have been efforts to summarize key findings of recent research on school size. In 1994, Howley focused on influences related to achievement and attainment (e.g., high school dropout rates), and noted evidence that smaller size seemed to improve the performance of schools serving impoverished communities. He also noted that several structural features of schooling had been reported to bear on the issue of size: grade-span configuration (the number of grades in a building), educational level (elementary vs. secondary), sector (private vs. public), location (rural vs. urban), and curricular focus (comprehensive vs. special purpose) (1).

Both Irmsher's and Raywid's research reviews, by contrast, summarized the influence on a wider range of outcomes, with each author concluding that a preponderance of evidence favored smaller size nearly universally. Raywid's summary pays particular attention to the policy issue of how large "small" should be. In brief, the upper limit of "small" had (as of 1997) been set at 350 for elementary schools and 900 for high schools.

Interestingly, Howley (1994) pointed out that studies based on "outcomes" (e.g., achievement, completion rates, attendance) recommend smaller size than those based on "inputs" (e.g., teacher salaries, instructional materials, specialized staffing) and Raywid (1999) observes that studies based on the value of "community" recommend sizes smaller than those based on "outcomes." Thus, researchers and policy analysts who are most concerned with "community" (Sergiovanni, 1994) will tend to recommend the smallest schools for nearly everyone; those concerned with outcomes will advise small schools but only for a portion of the population; and those most concerned with inputs will recommend schools that are larger than those recommended by other researchers.

THE MATTHEW PROJECT

Schools grew dramatically larger during the course of the twentieth century, and a huge professional literature that addresses school size now exists. But a surprisingly small

proportion of this literature constitutes the "research" base on school size, and comparatively few studies address the interaction of school size and poverty as a major concern. Only 22 research reports--during the whole period from 1966 to 2000--define school size, socioeconomic status (SES), and school-size issues as an important focus of investigation. Within this literature, however, the studies related to the Matthew Project are the only ones that pursue the issue systematically across multiple replications. In fact, the summaries of the literature cited above rely mostly on the early work in the Matthew Project in making the judgement that smaller size is "especially" beneficial for at-risk students.

Lee and Smith's 1996 study of high school size is frequently cited in reviews of the school-size literature, and their findings are consistent with those reported in the Matthew Project. Typically poverty exerts a strong negative influence on achievement. In schools with fewer than 301 students, they found that influence was sharply reduced. They also found that aggregate achievement (with all else being equal) was highest in high schools enrolling 601-900 students (grades 9-12). The Matthew Project studies take a somewhat different view of optimal size, concluding instead that optimal size is contingent on community SES, following the basic principle that the poorer the community, the smaller the schools should be.

The Matthew Project (2) was inspired by the work of Noah Friedkin and Juan Necochea (1988). Their study, carried out with California data describing school performance at four grade levels, concluded that smaller school size benefitted school performance in impoverished communities, but that larger size benefitted school performance in affluent communities. Howley (1996) conducted the first faithful replication of the 1988 study, using West Virginia data, with results much like those obtained by Friedkin and Necochea. The Matthew Project subsequently conducted four additional replications (Howley & Bickel, 1999). Together the seven states in which related studies have been conducted (AK,(3) CA, GA, OH, MT, TX, WV) reflect the range of schooling conditions in the United States: ethnicity, locale, poverty, region, and school district organization.

This series of related studies is important because replication is one time-honored method of validating research findings. Most studies in education, in fact, have dubious validity because they are seldom replicated. For this reason, these studies constitute an almost unique and particularly useful series in the research literature on school size. It is the only series of studies that focuses on the hypothesis that size mitigates the influence of poverty.

MATTHEW PROJECT FINDINGS

The Matthew Project investigated the possible academic "excellence" and "equity" effects of school size in Montana, Georgia, Ohio, and Texas at different levels of school socioeconomic status (Howley & Bickel, 1999). Achievement test scores analyzed for each state were those required by the state education agency (SEA). The studies included virtually every school in each state studied.

Excellence was measured in terms of "effect size" at varying levels of school socioeconomic status. Effect size is simply the ratio of an existing difference in terms of standard deviation units. An effect size of +0.5 is a substantial positive difference, meaning that larger school size would be predicted to "increase" achievement. An effect size of -0.5 is a substantial negative difference, meaning that larger school size would likely "decrease" achievement.

Equity was measured by dividing the schools in a given state into two groups--smaller schools vs. larger schools divided at the median of size. Then, the researchers computed the correlations between achievement and socioeconomic status within the groups. In one study (Bickel & Howley, 2000), there were, however, four groups: smaller schools within smaller districts, smaller schools within larger districts, larger schools within smaller districts, and larger schools within larger districts.



Excellence effects.

Excellence effects of size varied substantially by state, but like Friedkin and Necochea (1988) and Howley (1996), the Matthew Project studies found that the influence of size varied by SES level, with size exerting a negative influence on achievement in impoverished schools, but a positive influence on achievement in affluent schools. That is, all else equal, larger school size benefits achievement in affluent communities, but it is detrimental in impoverished communities. The practical import of the excellence findings can be translated as follows (Howley & Bickel, 1999):



In Ohio:

Between 41 and 90 percent of schools (depending on grade level tested) would likely produce "lower" average scores if the schools were larger, or (in these schools) higher scores if they were smaller. At the ninth grade level, 90 percent of schools are too big to maximize achievement. These schools serve 89 percent of Ohio's ninth graders.



In Texas:

Between 26 and 57 percent of schools (depending on grade level tested) would likely produce lower average student scores if the schools were larger, or higher scores if smaller. At the 10th grade level, 57 percent of the schools are too big to maximize achievement. These schools serve almost half (46 percent) of Texas' 10th graders.



In Georgia:

Between 36 and 68 percent of the schools (depending on grade level tested) would likely produce lower scores if the schools were larger, or higher scores if the schools were smaller. At the eighth grade level, 52 percent of the schools serving 48 percent of the students are too big to maximize achievement. The percentage of schools "at risk" in this way (i.e., too large to maximize achievement) is even greater at the elementary level.



In Montana:

In Montana there is only weak evidence that the effect of school size on the average academic achievement of students depends on the level of poverty among the students in the school. The effect was statistically significant only in grade 4. Montana's unique results are probably due to the fact that its schools are more uniformly small and income is more evenly distributed than in any of the other three states.



Equity effects.

While the excellence effects are substantial but varied in strength, the "equity effects" are remarkably strong and consistent from state to state. They show that in smaller schools, regardless of state, the relationship between achievement and SES is substantially weaker in the smaller schools than in the larger schools. The dividing line between "smaller" and "larger" in these studies varies from state to state, as median size varies by grade level tested and by state.

In all four states, smaller schools cut the variance in achievement associated with SES by between 20 and 70 percent, and usually by 30-50 percent, depending on grade level. In Georgia, Ohio, and Texas, smaller schools reduce the negative effect of poverty on average student achievement in every grade tested. In Montana, smaller schools significantly cut poverty's effect in two of the three grades tested.

POLICY IMPLICATIONS

A great deal of effort has been directed to breaking the bond between poverty and school achievement since the late 1960s, but with depressingly little benefit. Yet, findings from the Matthew Project clearly imply small schools help to thwart threats that poverty imposes on school performance. Many state accountability systems, of course,

monitor school performance, though no SEAs have yet acknowledged that large size further handicaps improvement efforts in impoverished communities. However, the Florida legislature recently imposed upper limits on school size (to take effect two years hence), and in California, the Gates Family Foundation has sponsored a multimillion dollar initiative to create new small schools. According to the Matthew Project findings, it would be important for such efforts to focus on creating new small schools in impoverished communities

People who assert that "all schools be small schools" have other values in mind than merely improving achievement; and providing smaller schools in very affluent communities could well prove to be counterproductive in terms of achievement. Even in affluent communities, however, schools serving 1,500 or more students might have diseconomies of scale and bureaucratic operating modes that are not educationally hospitable. Indeed, a wide consensus seems to have emerged (cf. Fulton, 1996) that schools larger than 1,000 are unwise choices for any community. The consensus clearly suggests that schools in impoverished communities should be much, much smaller.

(1) For instance, schools of differing grade-span configuration but the same enrollment are not really the same size in terms of their impacts on students; the one with fewer grades is larger. Elementary schools are generally smaller than high schools (with grade-span controlled), and private schools are generally substantially smaller than public schools. Comprehensive high schools are generally larger than special-purpose schools.

(2) Sponsored by the Rural School and Community Trust. For details about findings and methodology consult <http://www.ruraledu.org/matthew.html>.

(3) This includes a study by Huang and Howley (1993).

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Craig Howley directs the ERIC Clearinghouse on Rural Education and Small Schools and is an adjunct professor at Ohio University, Athens, Ohio.

Marty Strange directs the Policy Program of the Rural School and Community Trust in Randolph, Vermont.

Robert Bickel is a professor in the College of Education at Marshall University, Huntington, West Virginia.

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